Listing of Claims

The following listing of claims replaces all prior versions.

1. (Previously presented) An apparatus for spectral dispersion compensation in an optical communication network, comprising:

at least one optical medium having a signal distributed over a plurality of wavelengths, a portion of the signal on each wavelength;

a demultiplexer adapted to receive the plurality of wavelengths and divide the plurality of wavelengths into individual wavelengths, the individual wavelengths relatively delayed by a respective dispersion compensation element, each dispersion compensation element having a different delay characteristic to reduce inter-wavelength spectral dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelengths; and

a multiplexer adapted to receive each wavelength and combine the wavelengths onto the optical medium.

2. (Original) The apparatus of claim 1, further comprising a dispersion compensation element associated with each wavelength, the dispersion compensation element configured to reduce inter-wavelength spectral dispersion.

3. (Original) The apparatus of claim 2, wherein the dispersion compensation element is a Bragg grating.

4. (Original) The apparatus of claim 3, wherein the Bragg grating is a fiber Bragg grating.

5. (Original) The apparatus of claim 3, wherein the Bragg grating is a waveguide Bragg grating.

6. (Original) The apparatus of claim 1, wherein the multiplexer and the demultiplexer are a surface diffraction grating.

7. (Original) The apparatus of claim 1, wherein the multiplexer and the demultiplexer are an array waveguide (AWG).

8. (Original) The apparatus of claim 2, wherein the multiplexer and demultiplexer are an array waveguide and the dispersion compensation elements are waveguide Bragg gratings and the array waveguide and the waveguide Bragg gratings are combined on a single optical substrate.

9. (Original) The apparatus of claim 1, wherein the optical network is an optical code division multiple access (OCDMA) network and each wavelength comprises information that represents a portion of the signal.

10. (Original) The apparatus of claim 2, wherein the dispersion compensation element is located at an endpoint of the optical communication network.

11. (Original) The apparatus of claim 2, wherein the dispersion compensation element correlates the portion of the signal on each wavelength with respect to time.

12. (Original) The apparatus of claim 1, wherein the multiplexer and the demultiplexer are a single element.

13. (Previously presented) A method for spectral dispersion compensation in an optical network, comprising:

supplying a signal distributed over a plurality of wavelengths to a demultiplexer;

dividing the plurality of wavelengths into individual wavelengths;

simultaneously altering the relative timing among the wavelengths using a dispersion compensation element associated with each wavelength, each dispersion compensation element having a different delay characteristic, to reduce inter-

wavelength spectral dispersion and to synchronize the distributed signal with respect to time across the plurality of wavelengths; and

combining each wavelength onto an optical medium.

14. (Original) The method of claim 13, wherein the altering step is performed by a Bragg grating.

15. (Original) The method of claim 14, further comprising the steps of:

forming the demultiplexer as an array waveguide; and

forming the dispersion compensation elements as waveguide Bragg gratings.

16. (Original) The method of claim 15, further comprising the step of forming the demultiplexer and the dispersion compensation elements on a single optical substrate.

17. (Original) The method of claim 13, wherein the optical network is an optical code division multiple access (OCDMA) network and each wavelength comprises information that represents a portion of the signal.

18. (Original) The method of claim 13, wherein the step of simultaneously altering the timing of each wavelength is performed at one end of the optical communication network.

19. (Original) The method of claim 13, wherein the step of simultaneously altering the timing of each wavelength correlates each signal portion with respect to time.

20. (Previously presented) An apparatus for spectral dispersion compensation in an optical network, comprising:

means for supplying a signal distributed over a plurality of wavelengths to a demultiplexer;

means for dividing the plurality of wavelengths into individual wavelengths;

means for simultaneously altering the relative timing of the wavelengths, each means having a different delay characteristic, to reduce inter-wavelength dispersion and to synchronize the distributed signal with respect to time across the plurality of wavelengths; and

means for combining each wavelength onto an optical medium.

21. (Original) The apparatus of claim 20, wherein the means for simultaneously altering the timing of each wavelength is performed by a dispersion compensation element associated with each wavelength.

22. (Original) The apparatus of claim 21, further comprising:

means for forming the demultiplexer as an array waveguide; and

means for forming the dispersion compensation elements as waveguide Bragg gratings.

23. (Original) The apparatus of claim 22, further comprising means for forming the demultiplexer and the dispersion compensation elements on a single optical substrate.

24. (Original) The apparatus of claim 20, wherein the optical network is an optical code division multiple access (OCDMA) network and each wavelength comprises information that represents a portion of the signal.

25. (Original) The apparatus of claim 20, wherein the means for simultaneously altering the relative timing of each wavelength operates at one end of the optical communication network.

26. (Original) The apparatus of claim 20, wherein the means for simultaneously altering the relativc timing of each wavelength correlates each signal with respect to time.

27. (Previously presented) A spectral dispersion compensator for an optical signal distributed over a plurality of wavelengths, the dispersion compensator comprising:

a demultiplexer for spatially dividing an incoming optical signal according to the wavelengths;

plural dispersion compensation elements for adjusting the relative timing of all of the wavelengths concurrently, each dispersion compensation element having a different characteristic, and for synchronizing the spatially divided optical signal with respect to time across the plurality of wavelengths; and

a multiplexer for combining the wavelengths as adjusted into an outgoing optical signal.

28. (Original) The spectral dispersion compensator of claim 27, further comprising an optical coupler for coupling the incoming optical signal from a first optical fiber to the demultiplexer and for coupling the outgoing optical signal from the multiplexer into a second optical fiber.

29. (Original) The spectral dispersion compensator of claim 28, wherein the optical coupler is an optical circulator.

30. (Original) The spectral dispersion compensator of claim 27, wherein the optical signal is an optical code division multiple access signal.

31. (Previously presented) A method for spectral dispersion compensation for an optical signal distributed over a plurality of wavelengths, the method comprising the steps of:

spatially dividing an incoming optical signal according to the wavelengths;

adjusting the relative timing of all of the wavelengths concurrently using a dispersion compensation element for each wavelength, each dispersion compensation

element having a different delay characteristic, and for synchronizing the spatially divided optical signal with respect to time across the plurality of wavelengths; and

combining the wavelengths as adjusted into an outgoing optical signal.

32. (Original) The method of claim 31, further comprising the steps of:

coupling the incoming optical signal from a first optical fiber to the demultiplexer; and

coupling the outgoing optical signal from the multiplexer into a second optical fiber.

33. (Original) The method of claim 31, wherein the optical signal is an optical code division multiple access signal.

34. (Original) The method of claim 31, further comprising correcting for spectral dispersion within each of the wavelengths.

35. (Previously presented) An optical device comprising:

demultiplexer means for spatially separating by wavelength encoded components of

an optical-code division multiple access signal;

dispersion-correction means for introducing relative delays among the encoded components, each dispersion-correction means having a different delay characteristic, to yield dispersion-corrected and temporally synchronized encoded components across a plurality of wavelengths; and

multiplexer means for spatially combining the dispersion-corrected encoded components.

36. (Original) The optical device of claim 35, wherein the dispersion correction means corrects for dispersion within each of the encoded components.

37. (Original) The optical device of claim 36, wherein the dispersion-correction means includes Bragg gratings corresponding to respective ones of the encoded components.

38. (Original) The optical device of claim 37, further comprising a multiplexer serving as both the multiplexer means and the demultiplexer means.

39. (Original) The optical device of claim 38, further comprising a monolithic structure including the multiplexer and the Bragg gratings.